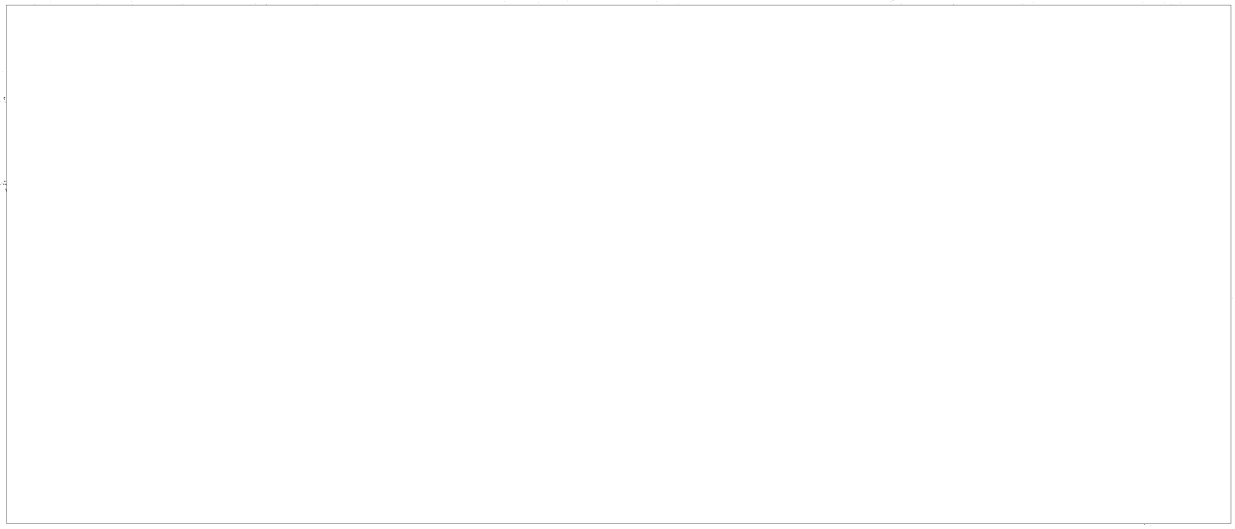

Our Problems ~~Concerning~~ in the Field of Semiconductors

A.F.Ioffe

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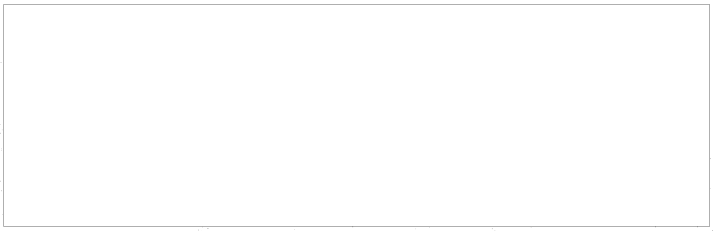

OUR PROBLEMS ~~CONCERNING~~ IN THE FIELD OF SEMICONDUCTORS.

A. F. Ioffe

Ioffe describes recent development and technical application of semiconductors in USSR.

Much profit is expected from semiconducting thermo electric batteries, applied to solutions of energetic and thermodynamic problems.

The role of semiconductors in studies of luminiscence and in thermo-electronic emission, as well as in secondary electron emission is described.

The discovery of photo~~elements~~ cells with a ~~stopping~~ blocking (barrier) layer is ascribed to v.A.Ul'yanin, the studies of superficial levels to Ye. Tamm, Semiconductors of small specific resistance to Shifrin, and further developments of theories to F.F.Volkenshteyn and V.L.Bonch-Bruyevich.

A.R.Regel studied semiconducting properties in amorphous substances, N.S.Kurnakov investigated metallic alloys, named daltonides and bertollides. B.I.Boltaks, V.P.Zhuze and I.V.Mochan prooved these alloys to posses a forbidden zone and ~~им~~ additional admixture layers, if their compound deviated from stoichiometry.

Another group of materials presented on the meeting were substances with a lattice of the diamond type. N.A.Goryunova studied grey tin and A.R.~~K~~egel selenium mercury.

The appearance of germanium amplifiers facilitated the widening of our knowledge of this type of semiconductors. We are interested in luminophores, photocathodes, organic dyes and processes of photography.

The problem of rectifyers stimulates new research. A.V.Ioffe studied electrical properties of the contact metal-semiconductor. V.I.Lyashenko and A.M.Pavlenko established the relation of resistance to the difference of contact potentials. A.I.Gubanov studied the contact of two semiconductors

and its rectifying power. An interesting example of ~~stopping~~ barrier layers and rectification with still not yet accounted for effects was presented by S.G.Kalashnikov. V.Ye.Lashkarev investigated ~~stopping~~ barrier and anti-~~stopping~~ barrier centers. Reports by K.B.Tolpygo were also devoted to this problem.

A.N.Arsen'yeva-Geyl reported new data on external photoeffect.

New theoretical conceptions were introduced in the reports by S.I. Pekar in his theory of polarons, stimulated by the works of D.L.Landau and Ya.I.Frenkel. A report by S.V.Tyablikov was devoted to the same subject.

New ideas in the theory of photoeffects were introduced by Ya.I. Frenkel by his theory of excitons, explaining the light absorption without photoelectric effect.

New approach to old problems was given by V.P.Zhuze, S.M.Ryvkin and V.Ye.Lashkarev.

E.I.Adirovich, N.A.Tolstoi, ~~ExRxRxxxxx~~ P.P.Feofilov connected the theory of semiconductors to luminiscence. N.D.Margulis, P.G.Borzyak and B.I.Dyatlovitskaya studied semiconducting cathodes.

Of special interest was a report by K.B.Tolpygo on the effective mass of electrons and holes.

If great progress was made in USSR in theoretical developments, the industrial application of new devices leaves much ~~criticism~~ to be desired. New photo~~resistors~~ conductive cells and thermistors, developed by B.T.Kolomiyets, and photo~~elements~~ cells devised by the Kiev Inst of Physics, are manufactured. But the production of rectifiers and amplifiers is not adequate. Sulphide rectifiers are hard to get and tensometers, suggested by ~~xxx~~ Kiev physicists and by A.N.Arsen'yeva-Geyl are not yet produced. Many other results of scientific research did not yet find their way to industry.

Research in experimental physics is lagging too. In Leningrad we have only recently ~~now start~~ initiated spectroscopy of soft x-rays. This study is necessary for investigation of energy levels of electrons in semiconductors. The study of optical and infrared absorption spectra also reveals the electron energy in a body.

Magnetic properties reveal the nature of chemical bonds and the sort of atomic forces. This subject was investigated by B.I.Boltaks and Ya.G. Dorfman.

Among other scientific achievements, the USSR possesses the best School of alloys and salt equilibrium guided by N.S.Kurnakov.

We should further mention thermal phenomena in semiconductors. Much work in this respect is done by Kh. I Amirkhanov and his coworkers in Baku and Makhach-Kala. Yu.P.Maslakovets, Ye.D.Devyatkova and L.S.Stilbans also give active in these problems.

~~The report ends with praise of Stalin and communism.~~